THE
VETERINARY JOURNAL

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JULY, 1919.

Editorials.

THE VALUE OF THE R.A.V.C. TO THE CIVILIAN COMMUNITY.

DURING the war we can truthfully claim that the Army Veterinary Service proved its worth both in economy and utility, and that its presence was as essential to victory and to the well-being of the army as any other branch. At no time, however, has its prophylactic worth been more proved to be of service to the civilian community than the present, when the question of the return of the army horse to civilian life has had to be considered. Especially is this the case where drafts from overseas have to be returned to England; as we, from our insular position, have unique opportunities for the abolition of certain contagious diseases which trouble our Continental neighbours terribly. Take, for example, Dourine. This disease, insidious in its onset, has recently caused the loss of tens of thousands of pounds in a certain breeding district, where the stallions alone cost at least £50,000 to £60,000 and the mares almost as much—a district, too, which once contained thousands of British army horses. Thanks to veterinary advice and supervision, Dourine is non-existent in England. So also are epizootic lymphangitis, ulcerative lymphangitis, periodic ophthalmia, and stomatitis postulosa contagiosa, all of which ravaged the army horses of France and Italy. That no outbreaks of these diseases have been reported in civilian communities in England can be credited to the advice given and the supervision exercised by the Royal Army Veterinary Corps; as also can the fact that glanders is well in hand, and that mange has not increased abnormally. When one considers that millions of horses and mules have been dealt with during the war, and that our British army animals were universally

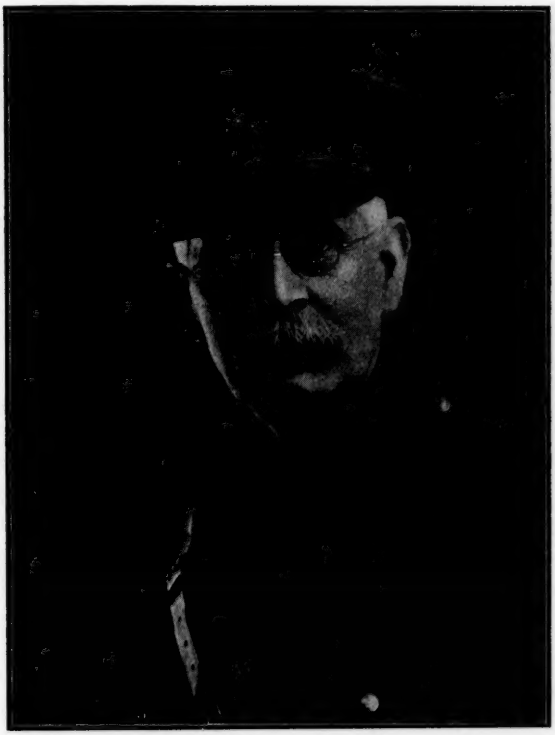
admitted by our Allies to look " the best in the world," and that our Army Veterinary Corps system was the envy of all our foreign confrères (not forgetting " Uncle Sam," who modelled his on our lines), the organisers, administrators, officers and men of the British Royal Army Veterinary Corps can afford to look back with pride upon good work done, and claim that they contributed a most useful share of the great work which terminated in so glorious a victory.

THE ANIMALS' ANÆSTHETIC BILL.

THAT animals, whose refusal or willingness to be operated upon is not a matter for question, should be dealt with in the most humane manner possible, is a motto which the inherent chivalry of every Englishman acknowledges—hence the outcry that for all painful operations on animals some anæsthetic shall be used. We of the veterinary profession claim that we have been the pioneers in this, and that wherever it is possible we endeavour to operate painlessly ; and we welcome the turning of the lay mind in the same direction to support us. With the powerful backing of such names as Earl Winterton, Lt.-Cols. Walter Guinness, Archer Shee and Greene, Sir Frederick Banbury, Sir Philip Magnus and Sir Samuel Hoare, with Messrs. Butcher, Bottomley, T. P. O'Connor, John Jones and Major O'Neill, the Bill should have a decent chance of success, and, although some amendments would improve it, that it may succeed is the earnest wish of every member of the profession whose duties carry him into the domain of operative veterinary surgery.

LT.-COL. SIR D'ARCY POWER, K.O.B.E., AND LT.-COL. AND BT.-COL. SIR GERMAN SIMS WOODHEAD, K.O.B.E.

ALTHOUGH, strictly speaking, they belong to the Sister profession, we know them well, and many old students and present members of the veterinary profession will be delighted to see the names of Lt.-Colonel Sir D'Arcy Power and Sir German Sims Woodhead in the recent list of honours. Both are well known to us, and in the rôle of teacher or examiner were much liked and held in universal respect. Each has sacrificed much during the war in the service of the country, and each has well earned the King's honour. Being members of the Territorial Force, each has served since the commencement, and many valuable lives have been saved owing to their mature experience. Sir D'Arcy Power, too, has suffered the loss of a son, and in this (and to Lady Power) the profession offer sincere sympathy. That both gentlemen may live long to enjoy the well-merited honour is the sincere and fully-expressed wish of all their numerous friends.



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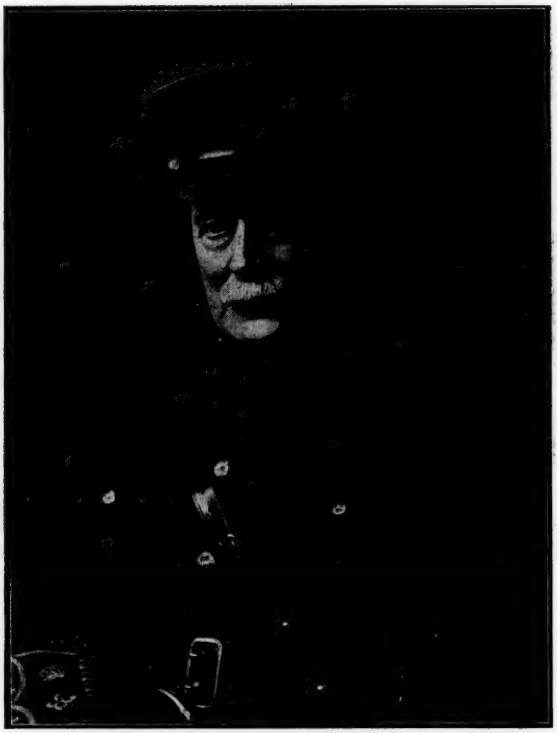

LT.-COL. SIR D'ARCY POWER, K.O.B.E., M.A., M.B., F.R.C.S.
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Original Communications.

THE VALUE OF FREQUENTLY REPEATED EXERCISE IN CASES OF LAMINITIS (ACUTE).

By Captain J. F. D. TUTT (late R.A.V.C., T.F.), M.R.C.V.S., F.R.M.S., F.Z.S. *Winchester.*

Having tried all the time-honoured remedies with varying success including the recently suggested alum treatment, I have concluded that the best and most gratifying results are obtained from the following method of treatment, and I therefore place it on record, as it may be of interest to the profession.

I now dispense with poulticing the feet as I consider it is waste of time, and, as it limits effective exercise, is to be condemned, as this is the very cause that brings on laminitis more readily than any other. I have the patient forcibly exercised for ten minutes every hour, morning and night, however acute the symptoms or the constitutional disturbance may be.

In conjunction, doses of liquor ammon. acet. conc. are given in ʒss. doses every 4 hours at the onset, either as a drench in O1 water, or in the drinking water, or in a *cold* mash; and this is reduced to three times a day when the temperature has fallen.

The coronets are also well rubbed with linimentum saponis meth. B.P., to which a little tr. belladonna or tr. opium can be added.

The exercise is kept up until the animal can walk practically normally, when it is reduced to every three or four hours, and discontinued when it walks about of its own accord.

The results obtained have been very gratifying and recovery has been very rapid in many cases, more especially in some recent cases encountered in mares after dystokia.

A recent case is cited for illustration :—

Subject.—Brown cart mare, 17 years old, foaled May 24th.

Acute laminitis developed the following day, and when seen the mare was in a state of high fever, profuse sweating, temperature 105°, all four feet affected, refusing to move until forced, and then only with great difficulty.

The mare was forcibly exercised for ten minutes every hour, until May 29th, when she was able to walk more freely and without being forced, and on June 3rd she was quite sound and was shod.

Conclusions.

From observations made on several cases, in which all the known remedies have been tried, it is concluded :—

1. That medicinal remedies by themselves are of very little value, except for reducing the constitutional disturbance.

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2. That exercise is essential, and should be enforced at frequent intervals until the patient is able to move freely, and not dispensed with until the patient walks about of its own accord.

3. That poulticing is of little use, and is to be condemned, as exercise is not so readily carried out.

4. That removal of the shoes of the affected feet should be carried out—although in some cases this was not done, and with no untoward results.

ANTHRAX.

BY M. C. GUPTA.

(Veterinary officer to the Macgregor & Co., Toungoo, Burma.)

Definition.—An acute infectious disease caused by *Bacillus anthracis.*

Occurrence.—Anthrax is usually confined to certain localities (so-called anthrax districts) where the moist, marshy or periodically inundated soil is suitable for the growth of the infective agent. In such localities the disease appears enzootically with a variable virulence, principally among animals at pasture in the summer time.

Etiology.—The infectious agent is a non-motile, rod-shaped organism. The bacillus anthracis is 1·5 to 4 per long and 1·0 to 1·5 per broad; the rods are often united. The bacilli themselves are readily destroyed, but the spores are very resistant, and survive after prolonged immersion in a 5 per cent. solution of carbolic acid, or withstand for some minutes a temperature of 212° F.

In animals geographically and zoologically the disease is the most widespread of all infections.

Pathogenicity.—The natural infection in herbivorous animals occurs usually through the ingestion of food and water which contains anthrax spores. When taken into digestive tract with the food or water, some survive the action of gastric juice and pass through the stomach unimpaired, germinating in the alkaline contents of the intestines, where they multiply by fission. The bacilli enter the lymph spaces of the intestines and finally reach the blood through the lymph stream.

The contamination of the food with bacilli and spores usually takes place from the infected soil on which it was grown. Anthrax bacilli which in some way, especially by means of blood or intestinal contents of affected animals, are deposited in the superficial layers of the soil may there remain alive for some time, and under favourable moisture and temperatures multiply or form spores. The spores are for a long time capable of propagation, resisting dryness and moisture,

cold and heat, as well as putrefaction, until favourable germinating new condition arises, whereupon the bacilli continue to multiply and produce new spores. In this manner the soil of a certain locality which has once become infected may remain a source of infection for a very long time.

The elevation as well as the moisture and temperature of the soil are naturally of great importance. The infective agent thrives best in moist soil rich in organic matter, generally in swampy, marshy soil, or in localities subject to periodical inundations. In such places anthrax usually appears when by a rapid recession of the ground water the superficial layers of the soil become exposed, and then in the presence of proper moisture and temperature germination of the spores and multiplication of the bacilli results. Consequently the disease is observed most frequently during the summer time, *particularly in warm days* following a period of rainy weather.

Forage plants are very apt to transmit the disease, since the animals always ingest with their food a certain quantity of dirt, which adheres to them. Further, in the infected localities the water contained in the pools may become contaminated.

The infectious material contaminates soil in many ways. The running surface water may carry along the spores and deposit them elsewhere. Likewise, the wind may carry them to previously infected localities from places where the water has receded and the surface layer of the soil has become dried. Most frequently, however, the soil becomes infected by carcases or parts of carcases as well as by the excrement of affected animals. When the carcases are not buried sufficiently deep or are left unburied the soil becomes heavily infected. The spores retain their germinating power for a very long time even in the deeper layers of the soil.

Wholesome food grown on uninfected soil is sometimes subsequently infected by the excrements or the blood of affected animals. The bacilli which contaminates the food may continue to multiply and form spores if the conditions of moisture and temperature are favourable.

The intestinal contents of affected animals are particularly dangerous, as they may not only contain bacilli, but also spores.

In anthrax districts, the intestinal contents of healthy animals may not infrequently also contain spores which have been ingested along with the food or drinking water and passed out through the intestinal canal without molesting the host. It is, therefore, possible for such spore-carriers to spread the contagion into uninfected territories without becoming affected themselves. According to Marchous

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and Salimbani the disease was spread in Brazil by a species of vulture, as they consume the anthrax carcase and then pass masses of spores from the intestinal tract with their fæces.

The introduction of a large quantity of spores is necessary for an active infection, and accordingly anthrax infections usually appear only after the ingestion of a considerable quantity of infected food or drinking water. The necessary quantity of spores varies with the individual susceptibility or resistance, which may be influenced by internal or external conditions. Animals which are affected with the so called "latent infection" not infrequently develop the disease as a result of external weakening influences through cold, physical exertion, starvation, etc. Furthermore, by repeated though slight intercurrent attacks the resistance of the animals is reduced, and under such conditions the anthrax bacilli begin to multiply, and thus produce the specific affection. This apparently accounts for the occurrence when elephants become affected with anthrax in four or five days after a long march and less food on account of tying up the animals at night during the march. (According to Opperman, healthy sheep may be infected by the feeding of 200,000 spores, while sheep which were previously starved were infected by feeding 51,000 spores). A reduction in the natural resistance is also claimed to be caused by protective inoculation.

Anthrax very rarely develops through skin abrasions, and only in those instances in which the injury to the skin extends through the epithelial layer. In this way bacilli as well as the spores may enter the tissue fluids, and in such cases the infection is transmitted through the blood, the excretions and secretions of the affected dead animals. The disease may also be transmitted through infected fodder, surgical instruments, hands and clothes of attendants and water. The injuries may be of the most varied origin; whereas, according to recent investigations, the transmission by flies and insects is considered doubtful. (Nuttal.)

Inasmuch as an artificial infection through inhalation of air containing spores is possible even when the respiratory mucous membrane is uninjured, such infection may occur under natural conditions when the animals are fed with dirty infected food.

Anthrax is not frequently transmitted direct from animal to animal. This kind of infection occurs only when the blood or infectious excrement of affected animals comes in direct contact with injuries on the skin or mucous membrane. Nevertheless, the diseased animal is a source of danger to its neighbours, as its excrement contaminates food, ground and water in the manner mentioned.

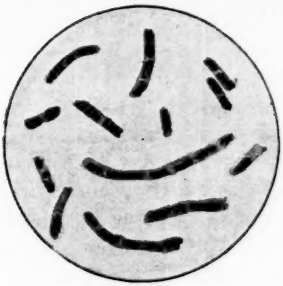

FIG. 1.—Bacillus Anthracis, with Capsules.

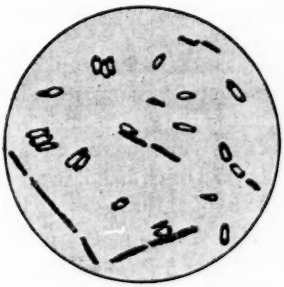

FIG. 2.—Bacillus of Malignant Edema.

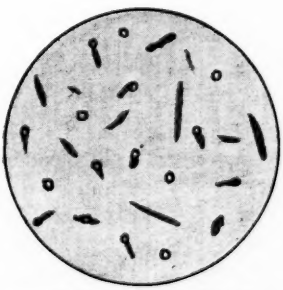

FIG. 3.—Blackleg Bacilli with Spores.

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Susceptibility.—Of the herbivorous animals, the elephants are the most susceptible. Fatigue, starvation and chilling may increase the susceptibility.

Susceptible animals acquire a long-lasting immunity against later infections after a recovery from the disease.

Pathogenesis.—The spores taken into the digestive tract germinate there and grow into bacilli. They then pass through the mucous gland and lymph follicles into the lymph spaces of the mucous membrane and submucosa, while spores which directly enter the connective tissue through injuries in the skin or mucous membrane germinate at the point of entrance. In the lymph spaces of the tissues the bacilli multiply by fission, although they are more or less inhibited and even partly destroyed by the hostile anthracoccide substances which are present in the tissue fluids. The final result of the infection depends, then, on the one hand, upon the resisting power of the infected organism, and on the other hand upon the virulence of the anthrax bacilli.

In immune animals even bacilli capable of producing dense capsules are quickly destroyed by the numerous anthrax destroying substances which are present in the tissue fluids before they have time to form protecting capsules. Consequently an infection in such animals remains ineffective. On the other hand, in susceptible animals which possess a smaller quantity of anthrax-destroying substances a greater or lesser number of bacilli remain active, form capsules and become more resistant, producing also capsuled progeny. In this manner the capsule-forming bacilli multiply at the point of infection, but in the meantime their destruction is also in progress, part of them taken up and digested by the migrated leucocytes.

Finally, the bactericidal substances of the body fluids are completely or almost completely neutralised, and therefore the bacilli, gaining entrance into the blood circulation, multiply therein very rapidly. The blood becomes heavily charged with the bacilli, and in a short time the animal dies—showing manifestations of a severe disease—frequently in a few hours or even less.

Anatomical Changes.—The carcases of elephants dead of anthrax decompose rapidly on account of the blood remaining in a liquid condition, and therefore they become as a rule greatly bloated. Rigor-mortis is generally incomplete. Dark red blood escapes from the body openings, the visible mucous membranes are cyanotic and frequently hæmorrhagic, especially on the prolapsed rectum. Autopsy shows extensive serous infiltrations and extravasations of blood at different parts of the body.

Symptoms.—The sporadic, endemic and epidemic anthrax are only modifications of the same diseases determined by the greater or lesser activity of the forces which are causations of this disease. The animals generally get the attack about an hour before daybreak, when the electric tension, pressure of the atmosphere and temperature are usually at the lowest. This is the time at which the attack of anthrax may frequently commence.

The incubation period of the disease, from my past and present experience of anthrax epidemic, I must say, is rather indefinite. It is not safe to put any definite time for this.

In the peracute cases the course of the disease simulates cerebral apoplexy. Well nourished and apparently healthy animals, which, however, were probably feverish, suddenly become dull, and so sometimes remain lying on the ground in convulsions; the respiration is rattling; pure blood even may escape from the anus until finally in a few minutes, or at most within an hour, the animal dies. This form of anthrax is observed most frequently at the beginning of an outbreak.

In the acute and subacute cases, which represent by far the largest percentage of cases, the disease commences with a rise of temperature to 102° F; at which height it remains for a time, dropping quickly just before death or the lysis, the latter if the animal can stand, may recover. Some elephants manifest quite a lively disposition at the onset of the disease and take their food in the usual manner.

In some cases the disease commences with restlessness and excitement, which soon pass into depression. In most cases, however, the malady is preceded by symptoms of general depression, the animal refusing to eat and standing in one place with head hanging, staring look and dilated pupils. The respiration is laboured and accelerated.

Very frequently disturbances in the digestion are observed. Apart from affected appetite the animal manifests severe colicky pains, but without any indication of bloating. At first there is constipation, but diarrhœa soon sets in, during which the fæces are fluid and frequently intermixed with a tinge of blood.

Besides these symptoms, which clearly indicate the presence of an acute infectious disease, acute edematous swellings develop on the surface of the body. In any region of the body, but especially on the neck, breast, flanks, a more or less extensive, rapidly growing swelling develops. With swelling of the neck there is usually associated edema of the glottis, which considerably increases the pre-existing dyspnœa. On the rectal mucous membrane carbuncular growths develop occasionally as a result of infection of manual removal of the fæces.

Course.—The development of the disease and the successively appearing symptoms as well as the general picture of the affection show great variations from case to case. While sometimes only half an hour passes from the onset of the disease until death, in other cases the duration extends to two and more, exceptionally to a fortnight. In slow cases the intensity of the symptoms may decrease temporarily so that the patients are somewhat brighter, and take some food, but the improvement is followed after a short period by new attacks. After an epidemic has continued some time the disease may assume a milder type and recovery takes place without any treatment.

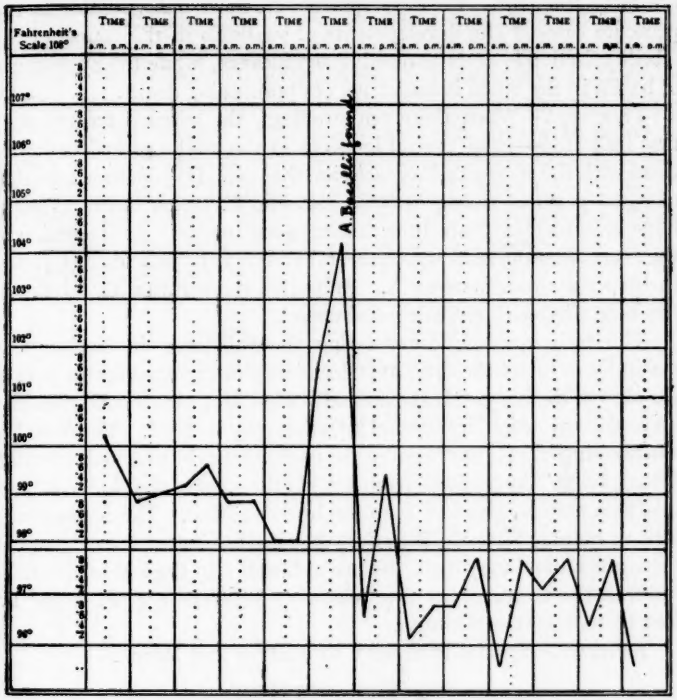
Diagnosis.—The above symptoms coupled with the bacteriological diagnosis make the case clear.

Bacteriological Diagnosis.—In living animals the diagnosis of anthrax is established by the morphologic demonstration of anthrax bacilli in the blood, since there is no disease known in which similar bacilli circulate in the blood. It is to be regretted that their detection is possible only a short while, at the earliest from 16 to 18 hours before death. After death of the animal the case becomes more difficult, since then there is possibility of confusion with other pathogenic bacteria, as well as with saprophytes. If the carcase is fresh the presence of large, non-motile rods and short chains in the blood is sufficient for diagnosis of anthrax. Relative to distinguishing anthrax bacilli from other bacteria more or less closely resembling them the following is to be noted.

(1) Anthrax bacilli are present in the blood of fresh carcases. They are thick, rounded at the ends or squarely cut, whereas (2) the bacilli of malignant œdema are more slender, motile, rounded at the ends and there of (3) Black leg bacilli which are present only in the serous fluids of the crepitating swelling in a fresh carcase. They are comparatively short and thick, motile, never grow in form of threads, and produce in the animal body, shortly after death, oval spores, located either at the end or in the centre of the bacilli.

In the examination of slightly decomposed material, the most important saprophytes that will be found are those resembling anthrax bacilli. They are differentiated principally by the fact that they do not possess capsules.

Bacillus Anthracis was probably the first bacterium to be recognised inasmuch as it was associated with splenic fever as long ago as 1849. The organism does not spore in the body of the animal, but if the air gains access, as in the case of an ordinary post-mortem examination, the organism spores rapidly and hence becomes a great source



Record of Temperature and Pulse of Elephant.
Admitted June 17, 1918—Discharged cured, July 7.

of danger. Undoubted cases of internal anthrax sometimes do not show the bacillus in peripheral blood circulation; hence justified in diagnosing the cases by clinical symptoms. Two hours after death the case becomes more difficult, since then there is possibility of confusion with other pathogenic bacteria. If the carcase is fresh the presence of large non-motile rods and short chains.

Prognosis.—Obviously anthrax terminates not infrequently in recovery, although it is hardly possible to estimate the percentage of recoveries with any degree of certainty. In the course of various outbreaks it is quite a frequent occurrence that some of the animals which were exposed to infection show an indisposition, but recover completely in a few days. Such passing affections are probably the result of an anthrax infection, which, however, is overcome by the energetic resistance of the animal. Towards the end of some epizootics the disease often assumes a subacute form and then cases of recovery

are more frequent. The developments are most unfavourable in the peracute cases. The developments of swellings in the course of the febrile affection is of unfavourable significance, while the appearance of bacilli in the blood is indicative of approaching death.

Treatment.—When there are swellings, the surgical treatment is first indicated—deep crucial incisions of the swellings and cauterise them with the strong carbolic acid are the best. Hypodermic injection of equal parts of strong carbolic acid and glycerine (2 drams each) have been used extensively with some good results. As the action of the heart generally fails, strychnine tabloids may be judiciously injected to keep the animal's strength. Ampsalvs (preparation of salvarsan) has been tried with some definite success.

The technique of administering the substance in elephants is generally to inject the drug hypodermically in any convenient part of the skin in the body. If the animal is of violent nature, and does not allow this operation, intrarectal injection may be tried. The drug has a depressing effect, and therefore the patient must be watched carefully. When giving " Ampsalvs," stimulants in the form of strychnine tabloid injection may be given to keep the heart's action. The temperature falls so quickly after the injection that if stimulants are not given at once, the animal may die of failure of heart. In the last outbreak of anthrax the temperature of an elephant fell from 104° F. to 96° F., four hours after the injection.

Reference.—Special Pathology by Hutyra and Marck.

CLINICAL FRAGMENTS.

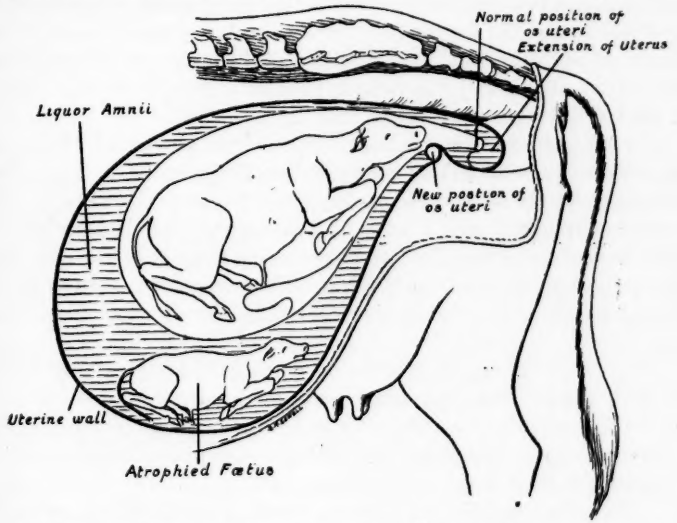
(*Continued from page 67, February issue.*)

By F. T. Harvey, F.R.C.V.S.
St. Columb.

IV.—HYDROPS AMNII IN THE COW.—THE MECHANICAL FACTOR.

Remarkable features of the above condition are the extreme distension which often occurs, and to a lesser degree the rapidity with which the fluid sometimes accumulates, especially towards the end of pregnancy. The owner perhaps has noted that the cow has been rather distended for some time, but that she has hitherto maintained a fair degree of comfort, then in a day or two there has been a great increase in the size of the abdomen. The cow becomes restless, her appetite goes, and the breathing is disturbed. At this stage if relief is not shortly brought about naturally, or by artificial means, fatal syncope is liable to occur ; or the abdominal wall gives way. At first sight one would naturally suppose that such an abnormal accumulation of fluid would automatically result in the yielding of the os,

with escape of some of the fluid and a consequent reduction of pressure, for it would appear that extreme distension of the uterus when quickly brought about tends to produce abortion. Thus in order to ascertain whether extreme rapid distension of the female uterus is responsible for the morbid changes found in eclampsia, Dr. Arthur H. Morse, in Yale University, exposed by abdominal section the uterus of a pregnant bitch, inserted a cannula into it, and injected saline solution until it was distended almost to bursting. No ill effects except abortion followed, and this occurred within twenty-four hours. (Quoted by Sir William Smyly.)



In the cow the walls of the uterus are over-stretched, the muscular fibres are weak, and the parts tend to yield. If no other factors obtained one would expect the os to dilate, and yet it often does not do so unless the patient definitely assumes the recumbent position.

In Fleming's " Veterinary Obstetrics," edited by Craig, it is stated that " Vaginal exploration discovers the os uteri closed, and the posterior part of the uterus projecting more or less into the vagina." This statement requires modification.

It is the postero-superior portion of the wall of the uterus which yields to the rising pressure of the amniotic fluid, and, becoming elongated, ultimately projects into the vagina, forming a large globular swelling, on the wall of which no semblance of an os is to be felt. When this stage has been reached, there is a considerable weight of fluid resting on the floor of the pelvis behind the os, and the latter is thereby

thrown out of action, and even if it is well dilated or relaxed no fluid can possibly leave the uterus.

In such a condition we have passed the fingers through the os and ruptured the membranes, and yet not a drop of fluid has left the uterus, so perfect has been the valve-like action determined by the over-distended state of the uterus.

In pregnancy the uterus advances forwards and downwards; it carries with it the cervix, and induces some elongation of the vagina, the traction being extended even to the vulva. In hydrops amnii this normal forward movement of the uterus and its related structures will naturally be accentuated, owing to the abnormal increase in weight and volume of the uterine contents. The latter holds the os in a more or less fixed position, and yielding of the uterine walls must take place from above, and will occur in the line of least resistance, which is the vaginal passage (see illustration).

In order to find the os in such a case one must take the same procedure as one adopts in finding the urethral opening, and pass the fingers along the floor of the vagina under the presenting uterus. A careful search may find it already well dilated, and the membranes may be easily ruptured, but as above remarked, probably no fluid will escape. Here one must syphon off with a catheter or other tube a large amount of fluid before the cow will be able to expel any of her own accord.

After withdrawing practically the whole of the fluid, and with the os fairly dilated, one may sometimes be unable, even with a long arm, to reach the fœtus. It should not be left many hours undelivered, as there is a marked tendency for it to become emphysematous, and the danger to the cow is then greatly increased.

When the condition of hydrops amnii is recognised at an early stage, we have seen abortion brought on in a few days by the administration of fairly large doses of iodide of potassium. The drug seems to have a marked ecbolic effect on the parturient cow.

One can estimate the degree of distension of the uterus by gently tapping with the finger tips of one hand the abdominal wall on one side, and estimating the character of the impulse wave with the finger-tips of the other hand on the opposite side of the abdomen.

The recumbent position tends to spontaneous relief as favouring release of the os. We recently saw a heifer unable any longer to get about, so great was the distension, getting rid of the fluid after being on the ground for twenty-four hours.

Explanation of the figure.—The dark line is intended to represent the outline of the uterus in a severe case of hydrops amnii. The inner light line a normally distended uterus.

V.—IODOFORM POISONING IN A COW.

A CROSS-BRED dairy-cow was delivered of her fourth calf early on the morning of March 7th last. The membranes were retained and after-pains became very severe, the straining being intense. We saw the cow at 10.30 a.m., and on examination found nothing in particular to account for the straining other than the presence of the membranes.

About half the latter were removed, and with the double object of preventing as far as possible a septic condition of the uterus, and also of utilising the local anæsthetic action of iodoform on the uterine mucosa, a fairly large amount of the drug mixed with boric acid and contained in gelatine capsules was placed within the uterus. Other treatment comprised hot cloths to the loins and vulva and anodynes internally. The pain moderated during the day, the cow took food, and at 10 p.m. she was chewing the cud.

March 8th.—In the words of the owner the cow had "gone to pieces" during the night. She stood with her nose poked out and took no notice of her calf. Yielding little or no milk, she refused absolutely both food and water. 10.30 a.m., pulse 130, resp. 25, temp. 102°, bowels sluggish and no urine passed. The cow appeared to be in a sub-conscious condition and reeled slightly when made to turn. The remaining membranes were removed, and not quite recognising at this stage the real cause of the brain trouble, a further small amount of the iodoform mixture was placed in the uterus.

March 9th.—Cow rather worse. Pulse 120, resp. 20, temp. 102°. Took neither food nor water, strained occasionally. Rambled when moved and seemed dazed.

Diagnosis.—Iodoform poisoning or a slowly developing attack of milk fever. The udder was inflated but it had no visible effect on any of the symptoms.

March 10th.—10 a.m. Pulse 120, resp. 20, temp. 101°. Owner stated that during the night the cow had been very ill, with frequent champing of the jaws and frothing at the mouth, together with convulsive movements of the limbs. Boring her head against the wall at times, she would then go over on her side and pass into a state of general convulsion, and the latter would be followed by a short period of quiet. Urine was passed in fair quantity at long intervals and the bowels were acting. A definite diagnosis of iodoform poisoning was made, but the contracted state of the os prevented the removal in a satisfactory manner of any unabsorbed drug lying in the uterus. During the rest of the day the cow's condition was most distressing, the convulsions being almost continuous, and a fatal result imminent.

At 6 p.m. one ounce of chloral hydrate was passed into the rumen through a cannula, and then another attempt made to dilate the os,

and this time successfully. Some fluid was found in the uterus, and this on being drawn off was found to have a distinct smell of iodoform. The cavity was thoroughly flushed out.

The mucous membrane seemed normal and there was a complete absence of anything suggesting sepsis.

A general improvement in the symptoms was quickly evident, and the convulsive state vanished. Convalescence, however, was slow, and fourteen days or more elapsed before the cow became quite herself.

Remarks. Cases of iodoform poisoning are not likely to be met with in the larger domesticated animals except as the result of using the drug in the form of uterine pessaries.

The extended use of iodoform in this way in recent years, however, adds some importance to the question.

According to Hare (*) the poisoning may be mild, merely consisting of a feeling of malaise, but if the system is still more impressed there occur cerebral excitement, insomnia, loss of memory, loss of appetite and a rapid pulse.

In grave cases convulsive movements and maniacal delirium, alternating with coma, may be the dominant symptoms. In these latter cases the onset is apt to be sudden, though from twenty-four hours to several days usually elapse between the application of the drug and the occurrence of symptoms of poisoning, and there is a marked tendency to fatty degeneration of the organs.

Susceptibility may exist, especially in the aged.

We regret in the case recorded being unable to state the exact amount of iodoform placed in the uter us—possibly it amounted to as much as three quarters of an ounce or more—through an oversight in dispensing. It would appear that pessaries or capsules containing a drachm of the agent should not be repeated too often, and we are inclined to think iodoform has some cumulative action; and further, it is not always easy to get unabsorbed material out of the uterus of a cow owing to the os becoming so contracted. We have on other occasions seen the appetite suddenly fail, shortly after having placed one of the iodine preparations, of which there are several on the market, within the uterus of a cow, and no doubt mild forms of poisoning do occur at times.

Lander (†) states that no difficulty ought to be experienced in the diagnosis of poisoning by iodoform, but we were struck by the remarkable resemblance in the early stages to some cases of milk fever, and

* *Text Book of Practical Therapeutics.*
† *Veterinary Toxicology.*

in order to test the point injected the cow's udder. And in this connection it is interesting to note that on the same farm in which the above case occurred there is at present (June 10th) a cow suffering from the effects of eating *œnanthe crocata* (water-dropwort), and here the owner says," The cow is very much like the other one " (iodoform case). In fact these cases prove the vastly greater importance of etiology, as compared with symptomatology, in conditions involving the nervous system, especially in bovines, when investigating any given case.

VI.—ADDER BITE IN A COW.

On March 24th last, about 12.30 p.m., two cows and three or four young bullocks were quietly grazing on some boggy land situate in the middle of a small enclosure, when a commotion was suddenly noticed amongst them, one cow being especially excited.

The farmer's wife on going to the field to inquire the cause was charged by the cow, and had to beat a hasty retreat. The beast was bellowing, rubbing her nose on the ground, and trying to get her foot on her tongue. In a few minutes the latter organ was seen to be swelling, and in the course of half an hour was protruding considerably. A continuous stream of saliva came from the mouth, and the swellin g extended along the submaxillary region. For about two hours the cow was on the verge of suffocation and presented a most pitiable appearance. Groaning was continuous and respiration most difficult.

From the third hour the swelling ceased to increase, and when we saw the patient, about 5.30 p.m., some of the œdema had cleared up.

There was considerable extravasation of blood towards the tip of the tongue, the parts looking almost gangrenous, and there was much shedding of the epithelium. The point of entry of the poison appeared to be about two inches from the tip, on the left side, towards the under surface.

Incisions were made, one on either side of the tongue, and the parts well irrigated with salt solution, and later a lotion of permanganate of potash was applied. Two days later the cow was reported to be well.

Remarks.—The case was regarded as one of adder bite, and about 1 p.m. on March 25th the owner saw and killed a viper quite close to the spot where the animals were disturbed the previous day.

On another farm a young heifer was bitten on April 3rd, in the lower lip. The reaction was not very severe in this case.

There would seem to be a greater risk of a bite about the time the vipers leave their winter quarters than later in the season. Their

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movements are then sluggish and they are unable to get away from possible enemies with the alertness which characterises their actions at a later date, and possibly the gland also furnishes a more toxic secretion after a prolonged rest.

The spring of 1919 was said to have been remarkable for the number of adders killed in the North of Cornwall, and we heard of twelve being accounted for by one man. It is probable that the lateness of the season, in checking growth, deprived the reptiles of some shelter, and that they were thus more easily seen.

According to Rose and Carless * the common adder (Pelias berus) is the only venomous snake likely to be met with in this country, and bites from it are rare in man. Dogs are probably most frequently bitten, and the aid of a charmer is often invoked as a cure. Adders are sometimes found in odd places. In the spring of 1918 one was found curled up in a horse stall near the manger. It promptly went into a hole when disturbed, through which it had probably emerged from its winter quarters.

*Manual of Surgery.

SOME CLINICAL NOTES ON THE OUTBREAK OF RABIES IN 1884-5-6.

By A. J. SEWELL, M.R.C.V.S.,
London.

As we are now again faced in England with a serious outbreak of rabies, I thought that the enclosed copy of some clinical symptoms of some twenty-five cases selected from a large number of others (which I noted down at the time) might prove interesting to your readers.

Case I.—June 3,'84.—Decided case rabies in brown retriever dog seen at Dogs' Home. Temp., 104-5. Dog destroyed.

Case II.—About June 14,'84.—Black and white greyhound with paralytic rabies, was seen to bite other dogs; afterwards showed decided symptoms of rabies; was killed third day. All dogs in same pen destroyed.

Case III.—Irish terrier dog belonging to a chemist, Elizabeth Street, Eaton Square. First day noticed not to be right, by his continual barking at other dogs when on the balcony; his bark, too, was noticed to be different; when brought into the house, he ran at the maid's feet, but discontinued this when spoken to sharply by his master. Temp. under arm 101.50—would not take any food. Second day still barked a good deal when excited; did not feed, neither did he offer to drink, though water and also milk was offered; was easily excited, and then gnawed at the box he was in; temp. 101 under

arm. Third day he was to be brought to the hospital, and was put in hamper for that purpose, but immediately got so excited and commenced to bite and pull the hamper to pieces that it was thought advisable to destroy him. The history obtainable was that three weeks previous to the symptoms of rabies showing themselves, the dog had a sharp fight with a half-bred fox terrier and got severely bitten in the shoulder, but this half-bred fox terrier remains well and healthy up to the present. It was not known that he had been bitten by any other dog.

CASE IV.—Aug. 2, '84. *Subject.*—Half-bred Irish terrier bitch at Dogs' Home. Was first noticed attacking and biting other dogs in same pen. When removed was quiet except when excited, when she gave the familiar rabid bark. She was ordered to be destroyed at once.

CASE V.—Aug. 23, '84. Pug dog aged about 14 years, belonging to a lady in Chester Square, was first noticed not to be well two days previously; it was also noticed to have an unusual quantity of saliva about the lips and was inclined to snap at other dogs. The following and next day all the symptoms were increased. I was requested to attend at Wimbledon, where the dog was temporarily staying, and the case was recognised to be one of rabies. The dog was brought to the Infirmary and died two days afterwards, on the 25th. The dog was under my care three weeks previously in consequence of a bad bite in the face from some strange dog.

CASE VI.—Sept. 6, '84. Bull terrier bitch at Dogs' Home, brought in by policeman from Cottage Road Station and found in Baker Street, W. While in charge of police was said not to have bitten other dogs. Very decided case rabies.

CASE VII.—Sept. 21, '84. Fox terrier dog aged eight years. This dog was first noticed not to be well the day previous, 19th. He refused food and was continually howling; he was at liberty amongst several other dogs, but never offered to snap any of them. When I saw him he was chained up in a horse box, and allowed me to go and unfasten him and seemed very friendly, but he had a strange appearance and seemed to be continually looking for something; he never offered to bite though I led him about the premises for fifteen minutes. Now and then he would utter the well-known howl, especially when offered anything to eat. The dog took a piece of meat in his mouth, but seemed unable to masticate it; when water was offered he tried to drink for some moments, by continually lapping, but was unable to swallow any. I had him removed to the hospital the same afternoon, and he howled occasionally throughout the night. On the 21st the symptoms were more marked, he became very savage and bit and worried the

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place he was kept in. The following day, 22nd, he was scarcely able to howl and there were symptoms of paralysis. He was destroyed then, which was four days from the time he was taken.

The dog was not known to have been bitten.

CASE VIII.—Sept. 25, '84. Collie dog, aged about one year, was first noticed to be out of sorts on the 23rd. It was not thought there was much wrong, but the dog was strange in his ways and inclined to gnaw at the tablecloth and hearthrug, and it was thought there was something in his throat. When the dog was seen to-day he was very weak, especially in the hind legs. He was very excited, wandering about the room and snapping at imaginary objects, and when his master tried to fix him he gave the characteristic howl and snapped. The dog had just had a motion, which he had tried to devour. He came home about three weeks previously with a wound in the ear, which looked like a dog bite, but it was not known by what dog he was bitten.

The dog was ordered to be destroyed. Temp. taken whilst dying 106.8°.

CASE IX.—Dec.'15, '84. Dogs' Home. Broken-haired terrier dog (small) 655, xiv. Was noticed to be wrong when it came into the home Friday, 12th inst., so was isolated. To-day the dog was very restless, gnawing the wood and wirework in front of kennel and uttering occasionally the well-known bark or howl; the eyes were very prominent, and the vessels of the membranes of the eyes were very congested; the membrane of the mouth was of the usual dark red colour. Food refused, and the dog was unable to take any water, though it tried.

16.12, '84. Temperature taken in the rectum 100° F. The nose remains cool and moist, which is an unusual occurrence in rabies.

17th. Died.

CASE IX.—January 9th, 1885. French poodle. The dog followed owner into office, and when I went in he walked towards me but did not offer to snap; as the dog walked away from me towards the door, I noticed an unsteady gait behind, and when he got to the door he gave the characteristic howl. The owner was requested to take hold of the dog, which he did, the dog offering no resistance, and a chain and collar was sent for; when the dog was securely fastened the owner was apprised of the dog's condition, and, as is usually the case, expressed surprise. When questioned on the matter the following history of the case was given: The dog was never known to have been bitten; for three days he had been very restless, snapping at people passing him (not known really to have bitten anyone?), and attacking all

dogs that came in sight, and as the owner remarked, " he occasionally gave tongue to a curious sort of howl." Destroyed with hydrocyanic acid.

Remarks.—Nothing unusual in this case, but I consider I was extremely fortunate in not being bitten when the dog came up to me when I entered the office where he was standing.

This is another instance of the careless way people allow their dogs to walk about, even though they notice that the dog is strange in his manner and very snappish, little thinking what risk they themselves are running as well as the general public.

CASE X.—January 19, '85. Liver and white spaniel. When I arrived at my kennels in the evening, I found a man standing outside the gate with the dog in question at his heels ; he wished me to look at the dog, as he was off his feed and the eyes were bad. It being dark I could scarcely see the dog, but it sounded from the man's description like a case of distemper. I requested him to pick the dog up and bring him inside, which he did, and I immediately detected, when a light was brought, that the lower jaw was dropped, and that it was a case of dumb rabies. The pupils were contracted to the size of a pin's head, the mouth and tongue were dry and a dark purple colour. The man stated when questioned on the case that the dog was first noticed queer last Friday, the 16th ; he said the dog would not leave him, but followed him wherever he went, which was a very unusual occurrence ; on that day he neither offered to snap at dogs on people, but the following day when taken out he rushed at every dog and attempted to bite them, but seemed unable ; one dog retaliated and bit the mad dog badly in return.

The dog had not offered to bite any human being.

This is another case showing how careless the owners of dogs are, but it is really through ignorance, as the man expressed the greatest surprise when told he must have his dog destroyed as he was suffering from rabies. There is no doubt that a certain knowledge of this disease should be had by everyone ; if this was the case, many valuable human lives might be saved, as well as those of the canine race.

CASE XI.—January 29th, '85. At Dogs' Home. A half-bred Irish and Scotch terrier dog came into the home day previous and was noticed when in the van to be continually licking the other dogs, and when put into the pen his affections turned to hatred ; he first snapped at one and then at another ; this caused his speedy removal to an isolated pen. On the 29th, he allowed himself to be caught and be examined, of course care being taken. Temperature 101.5° F. (about normal in rectum). Mouth appeared moist, not of the usual rusty colour ; had passed natural motion, the eyes appeared natural, con-

junctiva not infected, breathing quiet, but he would not take any food, neither did he utter any howl and he was not disposed to gnaw the surrounding structure. When brought in view of another dog became excited, wagged his tail and made a sudden snap.

January 30th. Symptoms, same as previous day, but took one or two pieces of meat, and Dobson (keeper) said he heard the dog once howl, but I could not induce him to.

January 31st. Symptoms still the same, with the exception of sclerotic and conjunctival membranes being congested. Temperature still normal, was not known to have taken any water; bowels acted.

February 1st. Ate several pieces of meat, seemed very quiet, rolled up in one corner of the pen and apparently sleeping, and when roused or called came towards door, but showed no ferocity except when brought in view of other dogs, which he would first try to lick and then suddenly snap. Temperature still 101·5° F. Pupil rather contracted to-day and membranes of eyes more congested, bowels operating regularly about twice a day. The motion rather dark colour but formed; was not known to have drunk any water.

February 2nd. To my surprise, dog was quite paralysed this morning, pupils contracted, mouth dry, breathing heavy, temperature still 101·5°—of course taken in the rectum.

Dog remained in an unconscious and paralysed condition all day, and died during the following night.

Post mortem was made on February 6th, 1885. Lungs healthy, as also was liver, but stomach good deal inflamed and the bowels slightly. Fauces only slightly inflamed, brain membranes only slightly congested, except one spot on the centre of the upper part, which was bright red colour. I have no doubt in my own mind that this was a case of rabies, and I form my judgment principally by the manner in which he snapped at other dogs, and from the condition of the eyes. The case is remarkable by the absence of most of the prominent symptoms of the disease, also from his taking food, and the bowels acting regularly, and last, but not least, the normal temperature throughout the attack.

Case XII.—January 31st, 1885. Collie bitch. When I entered stable where she was, she was lying down on some straw apparently asleep; the attendant at my request loosened the chain and led her into the yard, and her gait was very unsteady.

The lower jaw slightly dropped, but was able to close the mouth, but could not keep it closed; mouth was dry and membrane was of dark rusty colour, both eyes turned outwards and upwards. Temperature not taken. I may mention she seemed perfectly gentle until a cat came in view, when she became somewhat elated and tried

to get at cat. Died two hours after I saw her, as she was being brought into my hospital, she having been conveyed in a cab from Hampstead to my place.

History.—I learnt the bitch had taken her food quite regularly until two days previous, but two days previous to that she showed a good deal of animosity to a dog that was kept on the premises, which she succeeded in biting on the ear. She howled very frequently, but showed no signs of biting the man who was frequently in the stable and constantly tempting her to take food.

She was in the company of another collie bitch, in fact her mother, that was supposed to have died from rabies in the early part of November '84, but was not known to have been bitten.

CASE XIII.—February 28th, 1885. At Dogs' Home. Half-bred poodle retriever dog. Came in same day as above, was very snappish, but dog's general appearance looked natural and he ate some meat when it was offered.

March 2nd. Jaw slightly dropped, breathing hurried, temperature 104° F. The dog was still very excited when roused. Would not take food to-day.

March 3rd. Jaw more dropped, and showed weakness in hind legs; still would not feed. Temperature 103.2° F. Was destroyed to-day, which was the sixth day. I may remark temperature in dumb rabies is generally greatly below normal, but in the other form of the disease, though the jaw drops towards the end, the temperature is generally high.

CASE XIV.—March 20th, 1885. At Dogs' Home. Sable collie dog puppy, had been in the home for a day or two, was noticed flying and snapping at all other dogs, but when isolated he appeared very rational and even playful for two days, and took meat; was not noticed to howl or groan at its kennel.

On the 22nd, it was heard howling in the usual rabid manner, became very excited when teased, gnawed at the kennel and refused food, became weak on the hind legs and died on the 24th.

The most curious part of this case was that when isolated from other dogs it became quite calm and assumed a natural appearance, so much so that it was considered not to be a case of rabies at all, but was thought to have had a fit, he being a puppy. At this time, the 22nd, he could not be roused by excitement, but what anyone did the puppy seemed pleased and playful.

CASE XV.—Small rough mongrel terrier bitch. She was known to have been bitten by a suspicious looking collie when out walking with her mistress, but as the wound healed quickly no notice was taken. The first symptom noticed was a desire to lick, which was most

persistent throughout the attack. During the first two days she was licking her master's hands and face continually, and also the other dog in the house, but never offered to bite; the third day, as she was seen eating cats' fæces, she was brought me from her mistress for a pill (a frequent occurrence with this dog), as it was considered her stomach was out of order. I gave the dog a pill as requested without asking any questions or examining the bitch. Later in the afternoon she was brought again, this time by her master, and the above history told, and on examining the dog I saw she was suffering from rabies in its early stages. The bitch was confined, and for three days did not alter in appearances to anything out of the way, but on the sixth day the howling commenced and continued for some hours at intervals. Towards evening paralysis set in and she was destroyed. The last two days she became very furious.

CASE XVI.—August 4th, 1885. A black and tan dachshund dog. This dog showed a change of temper four days previously and was inclined to fight the other dogs in the house, but he was taking his food all right and seemed cheerful. Two days afterwards, on Sunday, the dog's bark was altered, and as the owner had lately had two dogs die barking in this manner she sought my assistance, not knowing what was wrong, but she was inclined to impute the cause of the dog's strangeness down to his worrying after a bitch then on heat.

I found the dog in the garden, he having gnawed his way through the window frame of the drawing room and broken the glass. He was continually uttering the rabid howl and gnawing first one door and then another, and altogether seemed in a very excited state. At my request she allowed me to poison the dog, which was done after some difficulty.

I may mention that this dog bit another dachshund bitch, also a bull dog in the ear, on the second day of the attack; neither of the wounds was cauterized, but the unusually faithful cook sucked the wound very diligently in the arm of the bull dog. The dachsund bitch became rabid about four weeks afterwards but the bull dog, whose wound was sucked, remained healthy.

This lady's first case amongst her dogs appeared in June, three weeks after one of her dogs was bitten in Hyde Park by some wander ing retriever. The lady, thinking the dog (her dachshund) was only upset by bitches being on heat, put a dachshund bitch in a room with him for company. The dog bit the bitch on both hindquarters, and the latter went rabid three or four weeks afterwards. This bitch in her turn bit the dog which I saw on August 4th, the subject of these remarks.

CASE XVII.—September 29th, 1885. Fox terrier dog. This was a case of paralytic rabies, and the dog though very quiet at first ultimately became very violent. This dog had been in its present owner's possession for about nine months, and was not known to have been bitten, though he was very apt to spar up to other dogs when out. I may mention that this dog frequently gave tongue to the ordinary rabid howl, which is another of the many instances which makes me state that the term "dumb" rabies, if applied universally to the form in which the lower jaw is paralysed, is a misnomer.

CASE XVIII.—October 30th, 1885. At a client's request I visited Mr. Holman's (V.S.) Infirmary at Blackheath, to examine a poodle dog belonging to the former gentleman, and said to be suffering from rabies. On opening the kennel door the dog seemed very quiet and agreeable, he allowed himself to be handled; the m.m. of the eyes and also the mouth appeared of a normal colour, the temperature taken in the rectum was also normal, and it was stated by the attendant that the dog had taken a biscuit and drank some milk just before my arrival. Altogether the animal appeared very natural, and there seemed very little wrong with him, but the V.S. said the dog had for the last two days occasionally uttered the well-known howl. It appears that this dog occasionally suffered from slight obstruction in the bowels, and it was usual when thus affected for him to be brought to this hospital to go under treatment; the dog had been suffering from one of his old attacks in the early part of this week and had to be treated accordingly, but the medicine, it was noticed, did not act with such freedom as was generally the case, this was not thought much of, so a second dose was given, which acted freely, but the rabid howl had been heard previously to this, and the case was rightly considered suspicious.

I did not see the case again until November 2nd, when I found all the symptoms of rabies fully developed. The lower jaw was slightly dropped, saliva was dripping from the tongue, the gait was unsteady, the membranes of mouth, tongue and eyes had become intensely congested, and the dog altogether presented a miserable appearance. Then I learnt the dog had been howling incessantly for the last two days, had refused all food and had gnawed the kennel considerably. Seeing the state of affairs I ordered the dog to be poisoned immediately, which was effectually done in my presence.

This case points out the value of the altered bark when any other symptom peculiar to the disease is absent, and this shows the great value of this one symptom.

CASE XIX.—November 4th, 1885. At Dogs' Home. Black retriever dog came in the van with other dogs, which he endeavoured to bite, but he was quiet with the men. He gave tongue to the usual howl, and when isolated became violent and gnawed the kennel. On the fifth the lower jaw had dropped, but he was as violent as ever and tried to bite anything that was presented to him. Temperature taken in bowel 102°. Destroyed this day.

CASE XX.—November 2nd, 1885. Fox terrier bitch which I was requested to see in consequence of being off her feed. On entering the room where the bitch was, I found her lying in her basket quite quietly; with the exception of staring very hard at me she took no further notice. She was muzzled and I then made an examination. I found the conjunctiva very inflamed, the vessels in the white of the eye were intensely congested, and the mucal membrane was of a rusty hue. On enquiring into the history of the case it came out that the bitch was knocked over in Blackpool in August last by a retriever, who was found to be suffering from dumb rabies, but it was not supposed that she had bitten the fox terrier, and nothing further was thought of the matter until the present time. The bitch was removed to my infirmary, where she remained until she died on the 5th. This was a somewhat curious case, as she never howled, neither did she show any disposition to gnaw, and she knew her owner's maid quite well on the 4th, but the membranes of the eyes became more inflamed, the pupils became very constricted, and the day before death the hind legs were paralysed. Mrs. Edwards remarked that for two days previous to my seeing the terrier she would fly at every dog that she met in the street.

CASE XXI.—November 26th, 1885. Pug dog, which was brought to the infirmary supposed to be suffering from eczema, as there was a large sore on left side of face caused by continued rubbing, the result of irritation. (This was the part probably where the animal had been inoculated.) The assistant placed the animal in one of the kennels as usual and informed me that the dog had been left for skin disease. I did not take much notice, not thinking anything was wrong, but during the afternoon I heard some dog in the kennel making a curious barking, but thought it was the terrier whose case I have just reported, I went to the kennels and found it was the pug that was barking and howling, and he appeared very savage on my approaching the bar of the kennel. The bark continued, but nevertheless he was removed to the kennels at Clapham, where he made the usual howling all night. Next morning the dog still showed the same symptoms and was more furious than ever when approached. It was noticed now that he was getting very weak in the hind legs. The dog lived until the next

morning, when he was quite paralysed, but kept up a low dismal howl; until the last, he also kept snapping at the straw and other things in reach. Died 9 a.m., January 28th, 1885.

This dog unfortunately bit a dachshund (badly in the ear) belonging to another client on the 25th inst., which animal is now in my kennels and is to be kept there for four months.

The pug was a dog that was always running about, but it was not known that he was ever bitten.

CASE XXII.—February 12th, 1886. At Dogs' Home. Black retriever dog. Came from Twickenham. On the dog's arrival he was noticed to be continually snapping at the other dogs in reach and was giving tongue to the usual rabid howl. Water was taken freely but food refused. The lower jaw soon gave signs of dropping. Destroyed next day.

CASE XXIII.—March 8th, 1886. At Dogs' Home. Black and tan terrier bitch from Dulwich. She was noticed to be snapping at other dogs on her arrival, therefore put in a pen by herself. Water was taken but food refused. Continually howling. Paralysis soon set in and she died on the 10th.

A post mortem was made. Tongue towards tip dark-brick colour, fauces very red and inflamed. Epiglottis slightly inflamed, mucous membrane of larynx very congested and of a dark blue colour, lungs slightly congested. Both ventricles of heart contained quantity of coagulated blood, stomach slightly inflamed and contained a mass of straw, hay, matting string, horse dung, etc., etc. Bowels not inflamed, badder very inflamed and the blood vessels on fundus very congested.

CASE XXIV.—March 26th, 1886. Fox terrier dog which was brought here with a muzzle on, and the attendant said the animal had been rather strange in its behaviour the last two days and very quarrelsome with other dogs. Coming through the streets to my office it attacked several other dogs, but was unable to bite them, the result of being muzzled. I had the dog put in a kennel and throughout the day he was continually howling, gnawing the bars and woodwork of the kennel. The following day the owner came and I being absent at the time, she demanded the dog, which was given up to her. I called at the house half an hour afterwards and cautioned her about the dog's condition. She would not believe that he was rabid, but insisted on allowing the dog to roam about the house and also the public bar. I did not go again as I was afraid of being bitten, knowing well that the person would not chain the dog up.

About a fortnight afterwards Mr. E. Ball, V.S. wrote and asked me about the above case, and stated that the owner had taken her dog to

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him two days afterwards, and it had bitten one of his men whilst putting the animal into a kennel.

The man was sent to the Pasteur Institute.

CASE XXV.—October 27th, 1886. A small black and tan terrier bitch, the property of Mr. Burlingham, Manor Street, Clapham. The bitch was brought round to the kennels in the evening under her owner's arm; she appeared very quiet and cheerful, but when put on the ground staggered slightly once or twice. Mr. B. said for the last three days she had been very restless, continually working her body about like a dog serving a bitch, and that she was continually howling. I put the bitch into a kennel and before she had been there a few minutes she commenced giving tongue to the well-known rabid howl; this she continued to do at intervals throughout the night. Next morning the symptoms were aggravated: she was gnawing the iron and wood work of her kennel, and biting and throwing the straw about, also her food tin. She drank some water. The eyes were staring and congested, and she continued to howl throughout the day and following night. The next day she was much weaker and quieter, and on the 29th at 11 a.m. she died.

The following post mortem observations on bodies received from the police are interesting:—

February 24th, 1886.—Black half-bred collie and retriever dog. Anterior third of tongue of a rusty colour, fauces and larynx only slightly inflamed; this was difficult to detect in consequence of a large loss of blood which took place when the dog was killed. The lungs were slightly congested. The heart contained a small quantity of imperfectly coagulated blood in the right ventricle, but the left was fairly well filled. The stomach contained some food, consisting of fish bones and other ingesta, as several splinters of wood. The bowels were inflamed, and the large vessels on the external surface of bowels were congested. The bladder was about half full of blood, and the vessels on the external surface of the bladder, especially towards the apex, were very congested. When the large vessels were cut through, blood escaped of a thick, tarry consistence.

M.M. of stomach greatly inflamed.

Impossible to examine the brain in consequence of being so much injured.

February 26th, 1886.—The body of a black retriever bitch was received from Kilburn Station. The tongue was of the usual rusty colour, the fauces and larynx were only slightly inflamed, and this is accounted for by the great loss of blood which occurred when the dog was destroyed. The lungs were slightly congested and the right one

was very hyperaumic. The mucous membrane of the stomach and bowels were greatly inflamed, and the blood vessels on the peritineal surface were very congested. The bladder was empty, but the vessels on the apex were congested. The heart contained (blood imperfectly coagulated) blood in both ventricles, but less on the right side than the left. When the large blood veins were cut through no coagulatic blood of a tarry consistence escaped freely. Head very much injured when animal killed, so could not examine brain.

March 8th, 1886.—Body of fox terrier received from the police for examination. Tongue dark rusty colour. Throat near glands in this part not much affected. Lungs slightly congested. Neither the stomach nor bowels inflamed, but the former contained a quantity of foreign material, as straw, hay, pieces of leather and string, also a quantity of dead leaves. The little white body in spleen double normal size.—(Rabies.)

March 13th, 1886.—Examined for the police body of white fox terrier dog with black markings, from Clapton.

Lungs congested. Stomach inflamed, and contained a large quantity of straw and other foreign material. Blood vessels on external surface of bladder congested. Tongue, fauces, larynx, etc., were not inflamed, but this is probably accounted for by the hemorrhage which took place when the dog was destroyed.

March 10th, 1886.—Examined for the police body of black retriever dog received from Belvedere.

Tongue (antr. third) of a slight rusty colour, fauces and larynx inflamed, as was also the right parietal gland. Lungs slightly congested. Heart contained imperfectly coagulated blood in both ventricles. Stomach inflamed but empty; there was also a certain amount of enteritis. Blood vessels on external surface of bladder highly congested.

The particular points worthy of note are :—

1. That any alteration from the normal habits of a dog should be looked upon with suspicion.

2. That during the incubation of the disease the dog is often more demonstrative and affectionate than usual towards his owner or those whom he knows.

3. That the rabid animal may be calm when in the vicinity of man, but thrown into a state of violent excitement at the sight of another dog or cat.

4. That the temperature is not a reliable guide, although in the early stages and the paralysed form it is usually subnormal, and in the violent stage it is raised. Mere muscular quietude or activity, however, might account for this.

5. That a rabid dog does not avoid water, but that the paralysed condition of the throat causes inability to drink.

6. The term "Paralysed Form" is better than "Dumb Form," as even in this stage the dog can give utterance to the peculiar howl so characteristic in an animal suffering from rabies.

CONTAGIOUS ABORTION QUESTIONS ANSWERED.

By Dr. F. B. HADLEY.

(*Continued from page 235.*)

Where can one have these blood tests made? At the Veterinary Science Laboratory of the College of Agriculture, University of Wisconsin, Madison.

What is the charge for making blood tests? A charge of ten cents is made to residents of Wisconsin for testing each blood sample. This is only enough to cover the cost of materials actually used. Residents of other States are required to pay 25 cents per test. Remittances may be made by stamps or cheque.

Is there a test for abortion that may be made in the stable? A diagnostic test fluid known as abortin, which is prepared and used much like tuberculin, has been employed, but the results from its application have been so unsatisfactory that it is no longer used. A physical examination is not reliable as a means of diagnosis.

Is there any other way of telling whether a cow is going to abort? Shortly before abortion occurs certain symptoms similar to those preceding normal parturition may be observed. They are not entirely reliable, for even after showing these symptoms the affected cow may have sufficient resistive power to overcome the effects of the germs and deliver a full-term calf.

Are the lesions produced by abortion infection characteristic enough to aid in making a diagnosis? The fœtal membranes in many cases show a brownish or yellowish pus-like material on the outer surface of the external membrane and a necrotic or rotted appearance of many of the cotyledons. Subsequently a uterine discharge is likely to occur, more especially if the membranes fail to come away promptly.

Does a retained afterbirth always indicate the abortion disease? It is apparent that retention of the afterbirth is a frequent result of abortion infection. However, there are other causes for this condition; therefore, it cannot be said to be a certain sign of abortion in every case.

How may it be shown that the blood tests indicate the progress of abortion in a herd? The figures in Table I. show the condition of a herd over a period of five years. It should be stated that while

every reacting cow did not abort in the year she first showed a reaction, most of them had aborted or did abort eventually. On the other hand, several that never reacted aborted, which indicates that the tests are not 100 per cent. accurate.

What percentage of the cows and heifers in infected herds react to the blood tests ? About 36 per cent. of all cows in herds where the disease is known to exist respond to the blood tests. This figure is based on tests carried out at this Station on more than 6,000 head of cattle.

How do calves from reacting cows respond to the blood tests ? New-born calves almost always give the same blood reaction as their mothers. As they get older those that have reacted gradually become non-reactors. When they reach breeding age most of them give a negative reaction. Later in life there is no appreciable difference in the proportion of abortion in daughters of positive and negative reacting cows. This fact tends to disprove the statement that the calves of infected cows harbour a latent infection which " lights up " when the animals become pregnant, and frequently results in abortion

How do calves fed on milk containing the abortion germs react ? At the Michigan Agricultural College calves were fed milk containing the abortion germs. After varying lengths of time their blood was tested, but very rarely was a calf found that gave a reaction. At the Wisconsin Agricultural Experiment Station calves that did react when young failed to do so after a few weeks. These experiments would indicate that the germs do not usually stay in the bodies of calves for any length of time.

Treatment for Abortion, Retained Afterbirth, and Sterility.

Will a cow recover from the abortion disease without treatment ? There is a prevailing belief that by letting the disease run its course it will die out without treatment. This belief is based upon the assumption that the cattle will develop immunity. While it is true that some cows do recover of their own accord, it is well known that the majority not given treatment are left more or less impaired. If the system of management described here is followed, the results will be far better than if nothing is done to combat the disease.

Can the abortion disease be cured ? It seems reasonable to believe that animals affected with the abortion disease can be cured, for experience teaches that animals affected with many other infectious diseases have been cured. Moreover, it has been shown that when the uterus of an aborting cow is given a chance to heal, all disease-producing germs are eliminated from it in a relatively short time.

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How should an aborting cow be managed? Immediately after a cow aborts, and before, if symptoms of abortion are evident, she should be removed from the herd to a specially prepared stall for observation and treatment. This may also be said of cows with retained afterbirth and a vaginal discharge. The fœtal calf, afterbirth, and contaminated litter must be disposed of at once in a sanitary manner. The place where the cow stood should then be well saturated with a reliable disinfectant prepared according to the directions of the manufacturer. The cow's rump, tail, vulva, and thighs should receive a daily thorough scrubbing with a warm disinfectant solution while there is any vaginal discharge noticeable. The vagina should be douched at once with warm one per cent. salt solution.

How is the one per cent. salt solution prepared? Two level tablespoons of common table salt are dissolved in one gallon of freshly boiled, blood-warm water. This is a sufficient quantity for one treatment.

If the afterbirth is retained, what should be done? A competent veterinarian should be called to determine whether the afterbirth should be removed at once. Intelligent, persistent treatment along the lines to be described is necessary in these cases if affected cows are expected to recover. Most cases of garget, blood poisoning, and subsequent sterility can be traced to failure to remove retained afterbirths at the proper time.

When should a retained afterbirth be removed? Normally the afterbirth loosens and drops of its own accord within a couple of hours. If it does not, there is no cause for immediate worry. It is impossible in the majority of cases to remove these membranes completely within the first 48 hours on account of their close union with the cotyledons or "buttons." The best time to attempt removal is between the 48th and 84th hours. At this time the ends of the uterine horns are more easily reached, the membranes can be separated from the cotyledons with greater facility, and will come away without tearing into shreds. In all cases where the placenta loosens earlier, it should be removed promptly, but force should never be used to remove a placenta, as the germs of abortion have already caused some damage and intensified the susceptibility of the cow to the other forms of infection which are always present awaiting a favourable opportunity for attacking the womb.

How should a retained placenta be removed? Both skill and judgment are needed by the veterinarian in removing a retained afterbirth. Several gallons of the warm one per cent. salt solution already described should be injected into the womb by means of a uterine catheter or a soft rubber tube, to one end of which a funnel is attached.

A double layer of clean muslin should be placed over the funnel to prevent the passage of dust and dirt. By attaching a pump instead of a funnel to the hose, the fluid can be forced further into the uterus, which is an advantage. Some veterinarians prefer a weak antiseptic solution, especially when the membranes are putrid. For this purpose a 0·5 per cent. solution of sodium hypochlorite has been recommended. This will dissolve necrotic tissue, counteract foul odours, and allay inflammation by destroying infection. If an antiseptic is used, it should always be followed with the salt solution to prevent subsequent irritation and consequent straining. The uterus should always be thoroughly drained so as to leave only the minimum amount of fluid. It is almost impossible, however, to drain out every drop, but with the aid of cotton swabs practically all fluid can be removed.

If the afterbirth is not easily detachable, what should be done? The uterine cavity should be douched with several gallons of blood-warm salt solution each morning and evening until the membranes loosen and come away. The douching not only should be continued twice daily until every shred of tissue has been washed away, but also every other day thereafter until the cow comes in heat; otherwise there is danger of her becoming sterile. Moreover, this is the most successful way to stimulate early esturation (heat), to insure prompt conception, and to prevent subsequent abortions.

What is meant by vaginal douching, and when should it be done? By the term "vaginal douching" is meant the flushing of the vagina. It is indicated after the mouth of the uterus has contracted so that the tube for the douche cannot be introduced and while there is a discharge. A careful stable attendant is capable of giving it if he has been properly instructed.

How should an infected bull be managed? It is a good sanitary measure to irrigate the bull's sheath before and after service, according to the directions described under the section entitled "Preventive and Control Measures." This certainly will help to keep the bull from transmitting the organisms that cause the secondary infections.

When should a cow that has aborted be bred? A cow should be bred the first time she comes in heat after all evidences of vaginal discharge have disappeared. Obviously, the length of time that should elapse before breeding a cow that has aborted would vary with the individual s response to treatment and her ability to recover from the effects of abortion. Experience has shown that the earlier the cow is bred, the more likely she is to conceive.

Is it profitable to treat all cows which have aborted or show signs of harbouring infection? Valuable breeding animals that fall in this class will certainly prove to be more profitable than non-infected

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animals that have not demonstrated their utility or developed any immunity. One reason for this statement was given in the answer to the question about the development of immunity; another reason is because experience has shown that if such animals are given proper treatment before and after conception occurs, they are quite likely to conceive normally and deliver healthy progeny.

(To be continued.)

AN INTERESTING CASE OF ADAM'S OPERATION FOR PARAPHYMOSIS AND MALFORMATION OF THE PENIS AFTER CASTRATION.

By FREDERICK HOBDAY, F.R.C.V.S.,
London.

THE patient was a valuable riding horse, five years' old, which had been castrated by Mr. John Young, F.R.C.V.S., by whom I was called in consultation. The operation had apparently passed off satisfactorily, but, as a sequel, paraphymosis had set in, and the end of the penis was now turned backwards, the horse being unable to retract the organ into the prepuce. This withdrawal into the prepuce was particularly prevented by an irregularly indurated ring of tissue, about four inches thick in the front and two inches at the back, extending all around the organ itself. The front portion had already become abraded owing to friction with the abdomen, and a large sore, fully the size of a couple of crown pi eces side by side, had already formed.

The horse was cast and chloroformed, Adam's operation being performed, and the whole of the indurated ring of tissue carefully dissected off. The edges of the mucous membranes at the top and bottom of the penis were then carefully united with interrupted sutures, and the whole was painted with iodine. As soon as the patient got up off the ground the penis was withdrawn naturally into the sheath, and recovery has since been complete.

This operation, which was first performed in America, is a most useful one, and was introduced into the British Army Veterinary Hospitals with great success. In France, especially during the bad weather of the winters and springs of 1916 and 1917, owing to the debility of the animals and the frightfully cold and muddy conditions under which the horses were compelled to exist, hundreds of cases of paralysis of the penis were met with. In some necrosis occurred as a complication, and all were frightfully troublesome. In a very large proportion of cases, even when the horses recovered condition, this paralysis of the penis still existed, and rendered the animal unfit for further war service. Amputation did away with the pendulous penis, but the risk of stricture was ever present, and Adam's operation came as a "godsend." It was beneficial in a very large proportion of cases,

especially those in which there was a heavy roll of indurated tissue around the penis, the weight of this being often very considerable. Once this was removed, the beneficial result was most marked, and in many instances in even a few days the penis was able to be retracted into the prepuce. Its simplicity, safety and freedom from hœmorrhage, together with the large proportion of success which followed its performance, has made this operation take its place amongst the neat and practical operations of veterinary surgery, and our thanks are due to our American *confreres* for their originality and for the lead they have given us in this branch of the veterinary art.

Translation.

SIMPLIFIED SURGICAL TREATMENT OF PARALYSIS OF THE PENIS IN THE HORSE.

By First-Class Assistant Veterinary Surgeon A. GUILLAUME (Army Veterinary Hospital).

The great number of horses affected with paralysis of the penis during the course of the campaign has enabled me to notice the inefficacy of medical therapy in the majority of cases, and to experiment on a comparatively large scale with the different recognised surgical procedures—ligature, cauterisation, elastic amputation, excision with the bistouri, etc.

Amputation practised according to the rules given by Cadiot and Almy, determined by MM. Decaux, Professor Douville, and then Charmoy is certainly the method which up to now has given the best and most durable results.

Last November, several American confrères having been detached to our D. C. M., we saw one of them—Veterinary-Captain William C. Van Allstyne—practise on three horses, affected with complete and old-standing paralysis of the penis, a surgical intervention current in America under the name of Adam's operation, whose elegance, ease and rapidity of execution, as well as the simplicity of the technique and excellent results obtained, have astonished us. We believe our readers will be interested in a description of it. The technique is of the simplest. There is no need of any preliminary preparation of the subject. The nature of the operation will clearly indicate that if it be a question of an entire horse it can only be practised after the animal is castrated and cured.

Cast the horse on the right side; fix the left posterior member as for castration or quittor. Wash and disinfect the sheath and penis, then anæsthetise the field of operation by a series of injections of cocaine or one single injection of 20 to 30 centigrammes at the level of the ischial arcade under the skin of the perineum.

I. By moderate traction draw the penis completely out from the sheath, and apply an india-rubber tourniquet close to the body (Fig. 1, A).

II. At 3 centimetres below the tourniquet make a circular incision involving the tegumentary membrane in all its thickness (Fig. 1, B).

III. At about 5 centimetres from the gland make a similar circular incision (Fig. 1, C). Join these two incisions by a third longitudinal one on the left face of the organ (Fig. 1, D). Dissect with care the skin in the space thus defined, taking care to raise all the infiltrated, œdematous or indurated tissues, always respecting the tunica albuginea to avoid hæmorrhage.

This operation complete, the penis is skinned the whole of the extent comprised between the two circular incisions.

IV. Take off the tourniquet and draw up the tegument (as in B, Fig. 2), excising on each side of it two triangular pieces of about 3 centimetres in width (*a*, *b*) and 4 centimetres long (*b*, *c*) ; then suture the lips of the two wounds thus obtained (so as to join the edge *a*, *c* to the edge *b*, *c*.

V. Nothing now remains but to reduce and suture the organ. In order to do this, use strong silk ; each suture being sufficiently long will be placed as indicated in Fig. 3, taking care to pass it under the tunica albuginea at a distance of 1 centimetre to 3 centimetres from the incision C (Fig. 3, A). One then puts in nine to ten sutures at equal distances all round the penis. The two extremities of each suture are joined by a knot which one tightens gradually and successively so as to approximate slowly incision C to incision B. As one draws these sutures one will see the penis go back into the sheath, and soon the two circular incisions (B and C) will come in contact. If the triangular bits have been well made, the cutaneous edges will coalesce perfectly.

This result obtained, proceed then to definitely ligature the sutures, watching that the lips, which have a marked tendency to incurve on the inside, coapt well (S.S., Fig. 4). Finish by consolidating this suture by a second very solid one overcasting it (S.S.).

Generally one can remove the sutures fifteen to sixteen days after the operation. Van Allstyne is content to clean the wound each day with tampons of dry cotton wool, and to dust the sutures afterwards with powdered oxide of zinc. He concludes the dressing by applying

a compress of crinkled gauze, and a linen suspender supporting the organ prevents dragging on the sutures.

We have experimented in this way on eight horses ; the operation, practised under as complete asepsis as possible, has given us the best results. We have simply replaced, and that with much advantage, the dry dressings by a daily cleansing with a warm physiological solution (9 per cent.), and then sprinkling the sutures with *Leclainche and Vallée polyvalent* serum. A tampon of sterilised gauze was then pushed into the circular furrow formed by the penis and the sheath, and held by a perforated suspender.

Fig. I

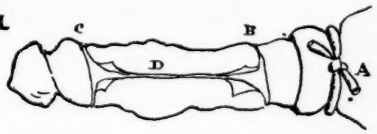


Fig. II

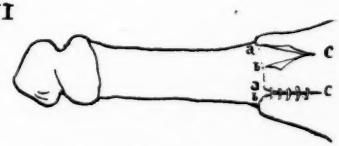


Fig. III

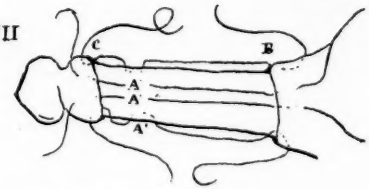
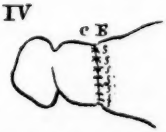


Fig. IV



Complete cure, has been obtained in three weeks. The penis had entirely retracted into the sheath ; a slight retraction of the tissues concealed the scar. It is useful to relate that the eleven horses on which the operation was practised were aged animals (12 to 16 years and over), convalescents from mange, very thin and weak from the illness, and cast for these reasons.

This operation, which is not new, appears to be little known in France. Professor Schwendimann, of Berne (*Schweizer Archiv fur Tierheilkunde*), in March, 1916, in a study on paralysis of the penis in

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the horse, indicates that Vennerholm in serious cases practises extirpation of the sclerosed tissues in a manner very similar to what we have described. His conclusions are as follows :—

1. The radical operation is indicated in all cases where a firm, ulcerated and indurated induration exists.
2. When the tumefaction is simply œdematous, medical treatment and massage are sufficient.

We are not of this opinion. Basing our conclusions on numerous cases of total paralysis of the penis which have been allotted to us for treatment in the D. C. M., and the quite constant uselessness of different medico-physical means employed, we consider that in all cases of old standing paralysis, always in aged subjects, and almost always in young subjects, and when there is induration or simply œdematous tumefaction, with or without ulcerations, fistulæ, etc., physico-chemical treatment is, if not regularly ineffective, always uncertain and risky. Economically it is always wise to adopt surgical procedure. The method we have described has the advantage of being quite simple of performance (numerous large American farmers, it appears, do it themselves). It necessitates no special instruments ; it preserves the integrity of the penis, and thus avoids the possibility of subsequent strictures. We think that on all occasions when the free extremity of the penis is not the situation of serious lesions, one ought to give it preference, reserving amputation, by reason of its gravity and of the delicate urethro-cutaneous suturing, for cases where deep or extensive lesions of the free extremity render amputation inevitable. —*Rev. Gén. de Méd. Veterinaire.* G. M.

ERRATA.—JUNE ISSUE.

Page 207, line 6—" miik " should be " milk."
Page 212, line 29—" ℥iv " should be " ʒiv."
Page 217, line 3—" C. Morgan " should be " E. Morgan."

NOTICES.

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